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X. *An Observation of a Solar Eclipse, October 27, 1780, at Providence.* By JOSEPH BROWN, *Esquire.*

MY apparatus for the observation of the solar eclipse was a three-foot reflecting telescope, with spirit levels ; a small graduated semi-circle of about  $4\frac{1}{2}$  inches radius, and rack motions for taking altitudes ; and a glass micrometer, fitted with rack motions, I believe of *Dolland's* construction, having a nonius graduated to  $\frac{1}{3000}$  part of an inch ; A reflecting telescope of near two feet ; and a prospect-glass of three feet four inches length, which I mounted on a convenient stand.

On the 20th, I moved my clock into a convenient part of my house ; and from that time to the day of the eclipse, I was constantly employed in taking corresponding altitudes of the sun with my telescope, and constructing a meridian-line.

Our observations of the eclipse were as follow :

The beginning was not accurately noted.

First seen in correct time, 10<sup>h</sup>. 58' 8"

Just touches a black spot in or near the middle of a macula at the right hand, 11 21 32

Just touches the first of four spots all nearly in a range in a macula at the left hand, 11 30 52

Ditto the spot nearest the centre of the sun's disc, 11 35 20

The end of the eclipse as seen by Mr. *West* in the small telescope, 1 39 1

Ditto by my brother in the spy-glass, 1 39 8

Ditto last seen by myself in the largest reflector, 1 39 16

I took the diameter of the sun while the eclipse was on, and made it three inches and  $\frac{4\frac{3}{8}}{1000}$ ; which, by my table, constructed in the year 1769, previous to the transit of Venus, makes the sun's apparent diameter  $32' 18''$ : And the smallest I saw the bright part of the sun was  $\frac{1\frac{4}{5}}{1000}$  of an inch: So small I am certain it was, and it might probably be a very little less, tho' I believe this to be pretty exact; and this, I think, makes the sun to be 11 digits and  $\frac{3}{10}$  eclipsed, or very nearly so.

